Zehfus Reply #4, para. 2

National Institute of Environmental Health Sciences

Cell Phones

Personal (cellular) telecommunications is a rapidly evolving technology that uses radiofrequency energy or radiation for mobile communication. As of December 2011, there were more than 331 million subscribers to cell phone service in the United States, according to the Cellular Telecommunications and Internet Association. Given this large number of users, if adverse health effects are shown to be associated with cell phone use, this could potentially be a widespread public health concern. The weight of the current scientific evidence has not conclusively linked cell phone use with any adverse health problems, but more research is needed.

What NIEHS is Doing on Cell Phones

The National Toxicology Program (NTP) headquartered at NIEHS is leading the largest laboratory rodent study to date on cell phone radio frequency. The NTP studies will help clarify any potential health hazards from exposure to cell phone radiation. The studies are designed to mimic human exposure and are based on the frequencies and modulations currently in use in the United States.

The NTP has worked closely with radiofrequency experts from the National Institute of Standards and Technology (NIST) to design highly specialized study facilities to specify and control sources of radiation and to measure their effects on rodents. The NTP studies are designed to look at effects in all parts of the body. Final study results are expected in 2014.

In addition to the NTP studies, the NIEHS is funding researchers at the University of California, Los Angeles *(http://projectreporter.nih.gov/project_info_description.cfm?aid=7739336&icde=4310872)* , to study whether exposure to cell phones in childhood can affect the nervous system.

Zehfus Reply, #4, para. 3

MedlinePlus®
Trusted Health Information for You

U.S. National Library of Medicine
NIH National Institutes of Health

Electromagnetic Fields

URL of this page: http://www.nlm.nih.gov/medlineplus/electromagneticfields.html

Also called: EMFs

Electric and magnetic fields (EMFs) are areas of energy that surround electrical devices. Everyday sources of EMFs include

- Power lines
- Electrical wiring
- Microwave ovens
- Computers
- Cell phones

Some people worry about EMF exposure and cancer. Some studies have found a link between EMF exposure and a higher risk of childhood leukemia, but other studies have not. Other studies have not found proof that EMF exposure causes other childhood cancers. Studies in adults did not prove that EMF exposure causes cancer.

Some people worry that wireless and cellular phones cause cancer. They give off radio-frequency energy (RF), a form of electromagnetic radiation. Scientists need to do more research on this before they can say for sure.

NIH: National Institute of Environmental Health Sciences

Start Here

- Electric & Magnetic Fields [http://www.niehs.nih.gov/health/topics/agents/emf/] *NIH* (National Institute of Environmental Health Sciences)

Overviews

- What Are Electromagnetic Fields? [http://www.who.int/peh-emf/about/WhatisEMF/en/] (World Health Organization)
  Also available in Spanish [http://www.who.int/peh-emf/about/WhatisEMF/es/index.html]

Specific Conditions

- Cell Phones [http://www.fda.gov/Radiation-EmittingProducts/RadiationEmittingProductsandProcedures/HomeBusinessandEntertainment/CellPhones/default.htm] *Easy-to-Read* (Food and Drug Administration) - PDF
- Cellular Phone Towers [http://www.cancer.org/cancer/cancercauses/othercarcinogens/athome/cellular-phone-towers?sitearea=ped] (American Cancer Society)
  Also available in Spanish
  [http://www.cancer.org/Espanol/cancer/Queesloquecausaelcancer/Otrosagentescancerigenos/telefonos-celulares]
- Electromagnetic Fields and Public Health: Mobile Phones
  [http://www.who.int/mediacentre/factsheets/fs193/en/] (World Health Organization)

Zehfus Reply, point #5, para. 1

Electromagnetic Fields

What are electromagnetic fields?

Electric and magnetic fields surround anything that uses or carries electricity. These lines of force are called electromagnetic fields (EMF).

The magnetic component of EMF is measured in milligauss. Background levels (the levels we are all commonly exposed to) usually range between 0.1 and 4 milligauss.

How can I be exposed to electromagnetic fields?

Functioning electrical appliances and power lines, produce EMF. Even the earth produces small amounts of EMF. Therefore, everyone is exposed to this form of energy. The highest EMF exposure can occur using appliances such as electric blankets, microwave ovens, and hair dryers.

Moving a short distance away from an appliance or power line will greatly reduce the strength of the electromagnetic field. For example, the EMF strength of an electric can opener at 6 inches is about 600 milligauss, but at 4 feet away, it's only 2 milligauss.

What are the effects of exposure to electromagnetic fields?

The effects of electromagnetic fields on human health are not well understood. Some studies show a relationship between exposure to EMF and the development of cancer, while other studies do not.

When scientists investigated the relationship between EMF and other effects on humans (e.g., miscarriage), their results were also mixed. A panel of experts recently reviewed all of the studies on EMF; they concluded there is not enough evidence to prove that EMF cause health problems other than a possible association with cancer.

→ Until more is known about the effects of EMF, prudent avoidance is advised.

How can I avoid being exposed to electromagnetic fields?

- Standing a short distance away from appliances while they are in use can significantly reduce EMF exposure. Move clocks and radios a few feet away from your bed. The strength of the EMF decreases dramatically when you increase the distance between you and the appliance.

- One way to reduce your exposure from an electric blanket is to warm the bed prior to getting in, and turning it off before going to sleep.

- Have electrical wiring checked and don't allow children to play around transformers or power lines.

- Allow your hair to air dry for a few minutes before using a hair dryer. This will reduce the time needed to dry it.

What should I do if I suspect a problem?

If you suspect that you are being exposed to high levels of EMF, limit your exposure. Follow the suggested guidelines above to reduce your EMF exposure. Contact your public utility company or local health department to find out how to measure the EMF in and around your home. EMF detectors are available from some electronic stores.

For more information

- Contact the Wisconsin Division of Public Health, Bureau of Environmental Health, PO Box 2659, Madison, WI 53701-2659, (608) 266-1120; or
- Visit the department's website, www.dhfs.state.wi.us/eh

Developed by the Wisconsin Division of Public Health,
Bureau of Environmental Health
1 West Wilson, Madison WI 53701
PPH 7103 (revised 11/00)

Zehfus Reply, Point #5, para. 2 (see next page for quote)

Date: Thursday, June 20, 1996
FOR IMMEDIATE RELEASE
Contact: Francis X. Mahaney, Jr., NCI Press Office(301)496-6641

Electromagnetic Field Exposure and Cancer Studies at the NCI

Since 1979, public concern has been raised over the possible health effects of low frequency electromagnetic fields (EMF) emitted from power lines, transmitters, and common household items such as computers, television sets, electric blankets, microwave ovens, and more recently cellular telephones.

Thirteen studies pertaining to children, and five pertaining to adults have been conducted to evaluate household EMF exposure in relation to the risk of cancer. So far, the findings have yielded mixed results in children, while no association between adult cancer and EMF has been found. Furthermore, no correlations have been observed between "directly measured" residential EMF exposures and risk for either children or adults.

While occupational studies have suggested a link between EMF exposures and adult leukemia and brain tumors, only four of these investigations have included measurements, and findings have been inconsistent. Study of Extremely Low-Frequency EMF Exposure and Childhood Leukemia

The National Cancer Institute (NCI) and the Children's Cancer Group (CCG), a multicenter network of pediatric oncologists and other researchers from 38 institutions and affiliated hospitals in the United States, are collaborating on a large-scale investigation to determine whether exposure to extremely low-frequency EMFs contributes to the development of acute lymphocytic leukemia (ALL) in children under age 15. ALL comprises 85 percent of all childhood leukemias in the United States.

The EMF study, directed by Martha Linet, M.D., is part of a larger CCG investigation comprising more than 1,900 ALL cases and 1,900 controls. The study is designed to evaluate the risk of ALL associated with a wide range of factors, including maternal diseases and medication use during pregnancy, childhood diseases, and other exposures, such as parental occupation.

For the EMF evaluation, more than 600 children with ALL and more than 600 controls were selected from those participants in the larger group who resided in nine states: Illinois, Indiana, Iowa, Michigan, Minnesota, New Jersey, Ohio, Pennsylvania, and Wisconsin.

The relationship between EMF and ALL is being assessed by interviewing mothers about electrical appliance use during pregnancy and in childhood, and measuring EMF levels in four rooms within current and former homes of the participants. The scientists also diagramed the location, type, and distance to external power lines, and measured the earth's magnetic field in current and former homes to determine its possible influence on extremely low frequency EMF measurements.

Data on individual subjects will be used to estimate the amount of prenatal and lifetime EMF exposure. Estimates will be made both for the children who developed ALL and their matched controls. It will then be determined whether EMF exposure is correlated with increased risk of childhood ALL.

This study will provide one of the first comprehensive and complete measures of EMF exposures in households with children. Results of two personal EMF dosimetry studies on children aged 0 to 8 years in the greater Washington, D.C., metropolitan area and older control subjects (nine years and older) have been published. *Results from the larger study should be available late in 1996 or early in 1997. Risk Factors for Adult Brain Tumors

The causes of brain and nervous system tumors are largely unknown, but genetic factors and a variety of environmental exposures have been implicated to varying degrees. Epidemiologic studies have linked central nervous system cancers with certain rare genetic disorders and with a variety of environmental exposures, including physical, chemical, and biologic agents. Public concern over the possibility that hand-held cellular telephones may cause brain cancer, and the lack of

identification of causes for most brain tumors, led to initiation of a comprehensive study of malignant and benign brain tumors to identify environmental and genetic causes for these serious but poorly understood diseases. NCI and extramural researchers will examine numerous factors that may affect brain cancer incidence, including occupational exposures, diet, vitamin supplements, use of home appliances and cellular telephones, reproductive and medical history, inherited susceptibility, and other factors.

The NCI case-control study, directed by Elizabeth Hatch, Ph.D., is being conducted at hospitals in Phoenix, Pittsburgh, and Boston. By the end of 1998, the researchers plan to enroll approximately 700 newly diagnosed brain tumor cases and an equal number of controls. The controls are patients admitted to the same hospitals with a variety of non-cancer diseases or conditions. Researchers are gathering information about possible risk factors through in-person interviews, self-administered questionnaires, and biochemical and molecular genetic analyses of blood samples. The occupational component of the study will improve on previous efforts to evaluate occupational risk factors for brain cancer by asking job-specific questions about tasks performed, specific chemicals and equipment used, and whether or not protective gear was worn.

Information will be obtained about use of cellular telephones, including the types of phones used (hand-held, car, transportable cellular phones or cordless phones) and frequency and duration of use. The researchers will also examine the consumption of foods and beverages containing N-nitroso compounds or their precursors and consumption of vitamins, fruits, and vegetables; medical and dental exposures to ionizing radiation; reproductive histories; exposures to viruses; and other preexisting medical conditions. Data collection began in 1994 and will finish at the end of 1998. Separate analyses will be conducted for different brain tumors.

Radar Exposure and Cancer

In 1980, the National Academy of Sciences conducted a 20-year follow-up study of 20,000 U.S. Navy personnel to determine whether sailors exposed to high intensity microwave radiation (radar) during the Korean War were more likely to get cancer than sailors with no or minimal radar exposure. The study, was published in the July 1980 issue of the American Journal of Epidemiology, found no association between radar exposure and cancer. NCI and the National Academy of Sciences are conducting a 40-year follow-up study on this group of sailors. The study, under the direction of Frank Groves, M.D., of NCI, will be completed in 1998.

* Development of a Protocol for Assessing Time-Weighted-Average Exposures of Young Children to Power-Frequency Magnetic Fields-W.T. Kuane and M.S. Linet et al., Bioelectromagnetics 15:33-51 1994

Childhood Exposure to Magnetic Fields: Residential Area Measurements Compared to Personal Dosimetry-Diana R. Friedman, Elizabeth E. Hatch, Martha S. Linet et al, Epidemiology 7:151-155 1996

The National Institute of Environmental Health Sciences recommends that anyone concerned about the possible side effects of EMFs may do the following to reduce exposure:

- Increase the space between a person and devices that may emit EMFs.
- Avoid standing too close to computers, microwave ovens, or TVS.
- Reduce the time of exposure to possible EMFs by turning off devices such as electric blankets when not in use.
- Avoid keeping such devices as electric alarm clocks too close to the bed.
- Discourage children from playing near high power lines or transformers.
- Avoid activities near EMF sources.

For more information on this subject call the National Institute of Environmental Health Sciences at: 800-NIEHS-94

The Cancer Information Service provides a nationwide telephone service for cancer patients and their families, the public, and health care professionals. The toll-free number is 1 800 4 CANCER (1 800 422 6237); services provided in English and Spanish. People with TTY equipment may call 1 800 332 8615.

This document is available through the NCI's CancerNet services on the Web (cancernet.nci.nih.gov) and through Cancer Fax (dial 301-402-5874 from the handset on your fax machine).